Operating System

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System Software

- A software that manages computer system and interacts with hardware.

- A system software provides environment for creating and running application software.

- System software can directly interact with hardware to make it functional.

- System software controls internal working of a computer system.

- Operating system, Device Drivers, Firmware, Translator and utility software are types of system software.

Examples of System Software

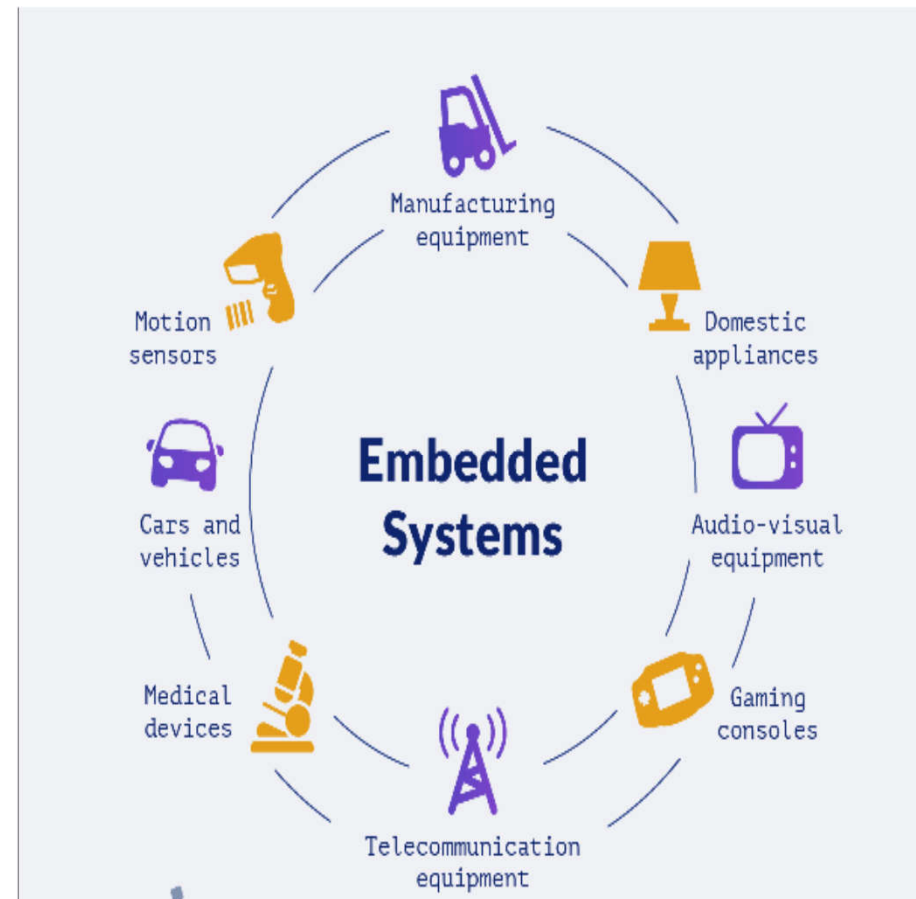- Operating System ➜ MacOS, IOS, Microsoft Windows, Linux…

Examples of System Software

- Device Drivers ➔ Let's OS communicate with specific hardware like Computer printers, Graphics cards, Modem, network card, sound card.

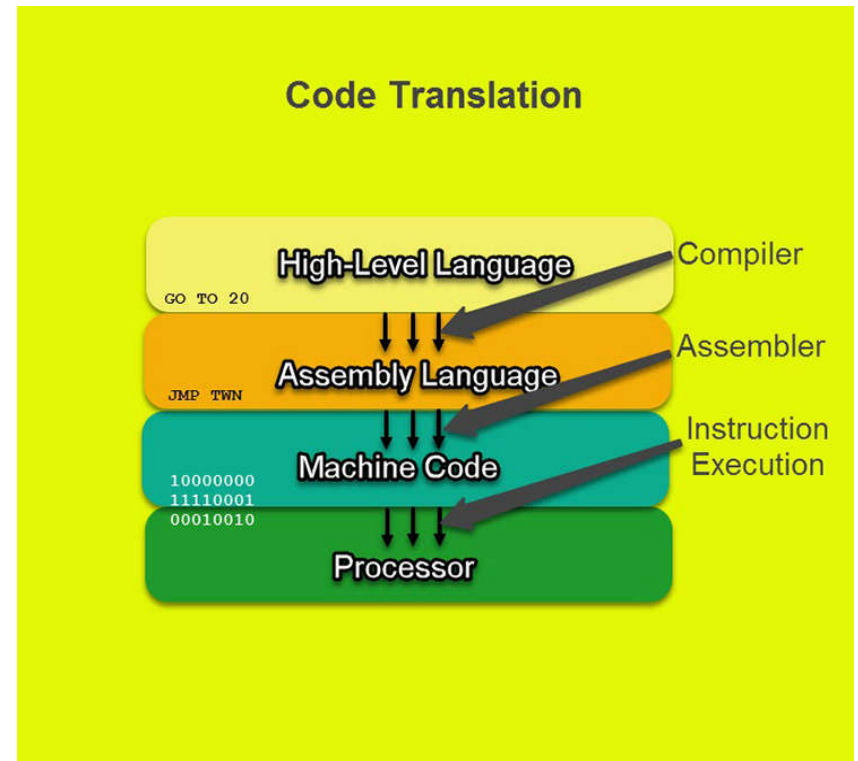

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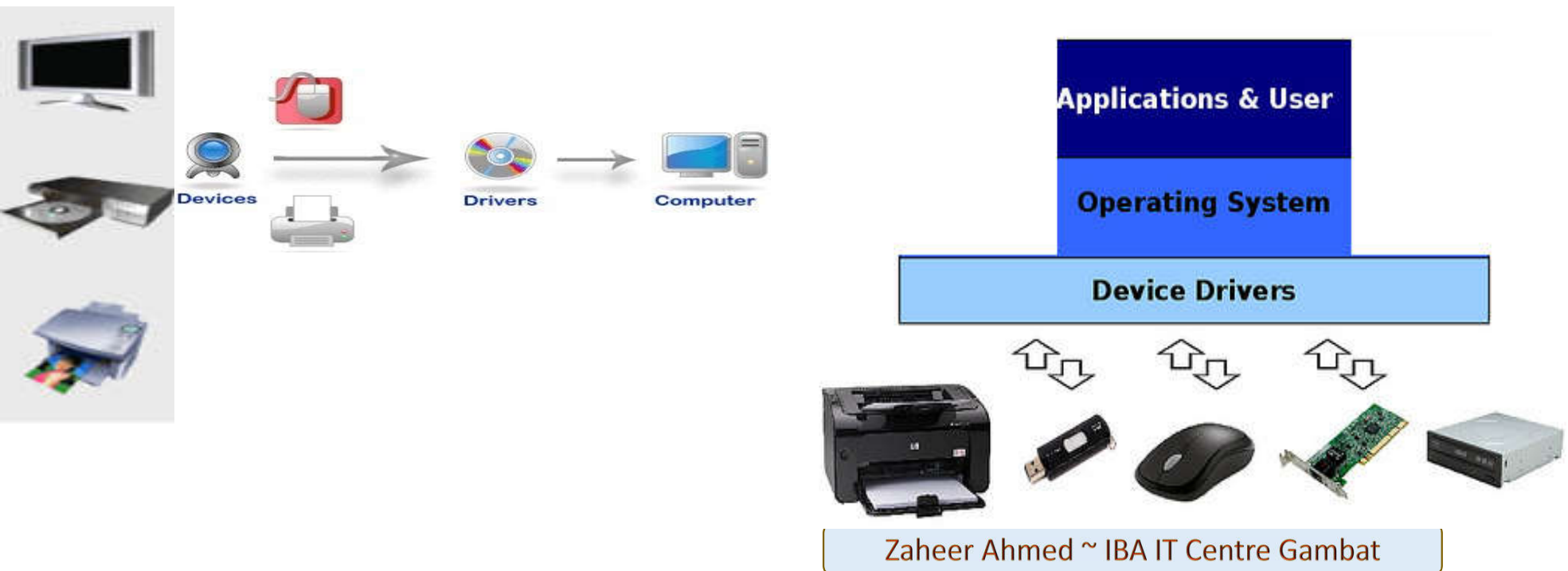
Examples of System Software

- Firmware is a System software that is embedded in a hardware.

- Firmware ➔ BIOS in rom chip, mobile phones, software in consumer appliances like tv remote controllers, portable dvd players, refrigerators

Manufacturing equipment

Domestic appliances

Motion sensors

Embedded Systems

Audio-visual equipment

Cars and vehicles

Medical devices

Gaming consoles

Telecommunication equipment

Examples of System Software

- **Translators** ➔ Software that translates code for the hardware of the computer.

- Examples: Compilers, Assemblers and interpreters.

Code Translation

High-Level Language — Compiler
GO TO 20

Assembly Language — Assembler
JMP TWN

Machine Code — Instruction Execution
10000000
11110001
00010010

Processor

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Examples of System Software

- **Utility software** ➔ System software that are designed to analyze, configure, optimized and maintain a computer.

- Anti-virus, Backup software, Disk cleaners, Defragmenters, Disk Space analyzers.

Deleting data | Disk defragmentation | User accounts and security | Anti-virus software

Software updates | System cleanup | Encryption/decryption | Formatting

Operating System

- System software that manages computer resources and provides an interface to user for system interaction.
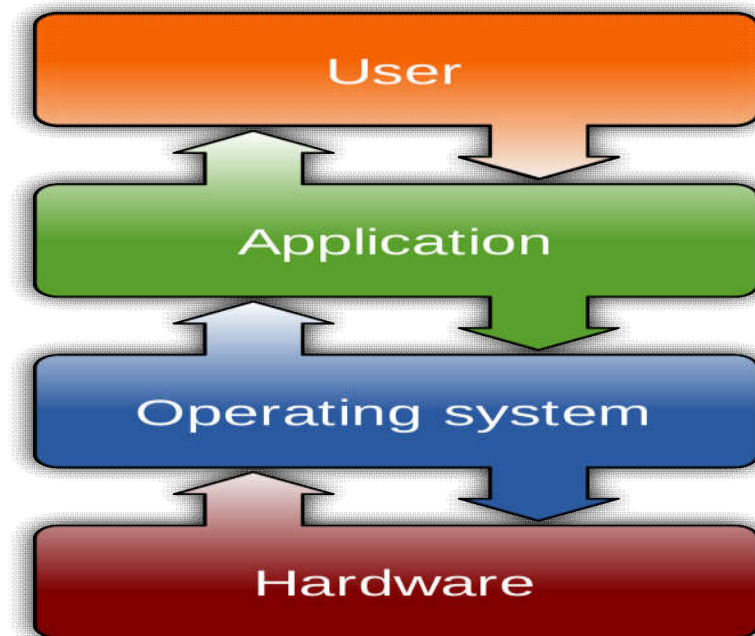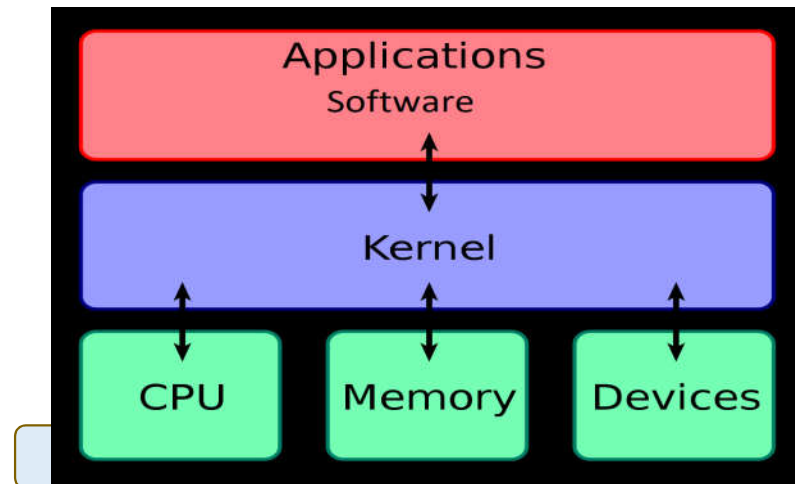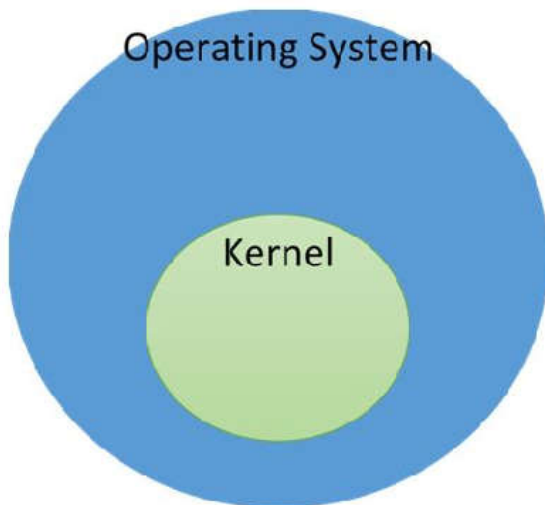
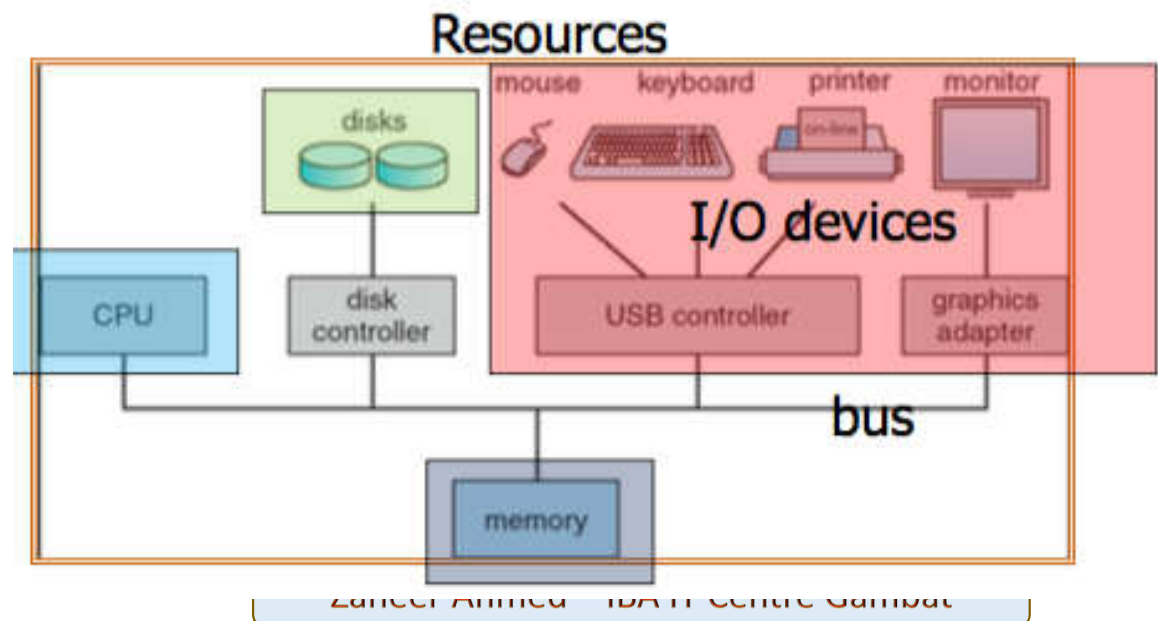

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Operating System

- Central or core part of OS is called **Kernal**. First part to load in memory when PC is turned on.

- Kernel resides in main memory and controls access of programs to system resources while managing multiple program in memory.

Operating System

- Resources ➔ Any device that Operating system makes use of to do a specific task for the user and operating system.

- Memory, CPU, I/O Devices.

Resources

mouse   keyboard   printer   monitor

disks

I/O devices

CPU   disk controller   USB controller   graphics adapter

bus

memory

User-Interface to Interact with OS

- **Command line Interface**: uses text commands to perform specific Tasks. Examples are DOS.

- Before invention of mouse users interacted with the computers using text commands from keyboard.

- Microsoft windows provide command prompt program that works like DOS.

- Start Menu>>cmd

```
Starting MS-DOS...

HIMEM is testing extended memory...done.

C:\>C:\DOS\SMARTDRV.EXE /X

MODE prepare code page function completed

MODE select code page function completed
C:\>dir

 Volume in drive C is MS-DOS_6
 Volume Serial Number is 40B4-7F23
 Directory of C:\

DOS          <DIR>            12.05.20    15:57
COMMAND   COM        54 645 94.05.31     6:22
WINA20    386         9 349 94.05.31     6:22
CONFIG    SYS           144 12.05.20    15:57
AUTOEXEC  BAT           188 12.05.20    15:57
         5 file(s)          64 326 bytes
                        24 760 320 bytes free

C:\>_
```

Graphical User-Interface

- **Graphical User Interface**: Uses graphical icons or images to run different programs and provide user-interface.
- Windwos, and MacOS,
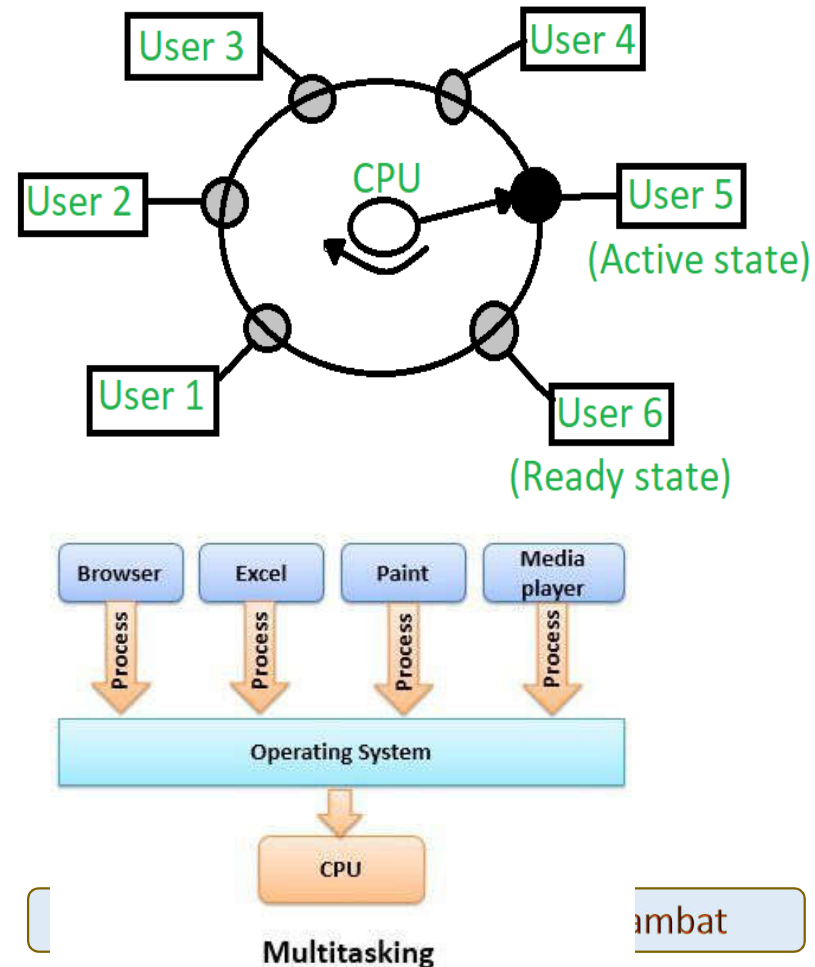
Overview of Operating System

Types of OS
- Batch OS
- multi tasking
- Time Sharing
- Real Time OS
- Disributted OS

- **Types based On Processing** .

- **Batch OS**: Same types of jobs or processes are prepared by the programmer and run in batches by the operator or operating system.

- Batch OS were one of the first OS.

- Modern system have some of the features retained from Batch OS

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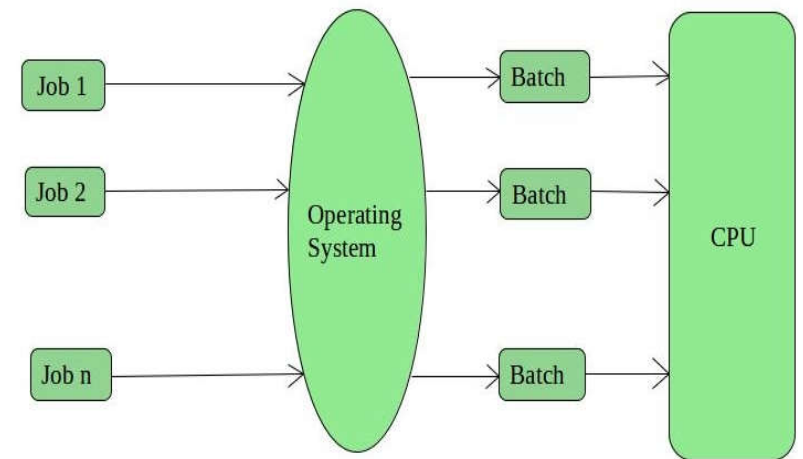
Overview of Operating System

- **Types based On Processing** .

- Multi tasking/Time Sharing:

  Can handle multiple jobs at

  the same time and time

  sharing allows multiple users

  to share a single system or

  CPU.

User 3   User 4

CPU

User 2   User 5

(Active state)

User 1   User 6

(Ready state)

Browser	Excel	Paint	Media player
Process	Process	Process	Process

Operating System

CPU

Multitasking

ambat

Overview of Operating System

- **Types based On Processing** .

- **Real Time OS**: Real time Operating system perform immediate processing on the data entered.

- OS in industrial machinery, home appliances and Robots.

- OS in weather forecasting systems and radars.

- OS in equipment of space technology.

- OS in x-ray machines

Overview of Operating System

- **Types based On Processing** .

- **Distributed OS**. A central operating system that can run on multiple system or machines..

- This type of has the ability to use the resources of multiple computer systems.

Distributed Operating Systems (DOS)

| Machine A	Machine B	Machine C
Distributed applications		
Distributed operating system services		
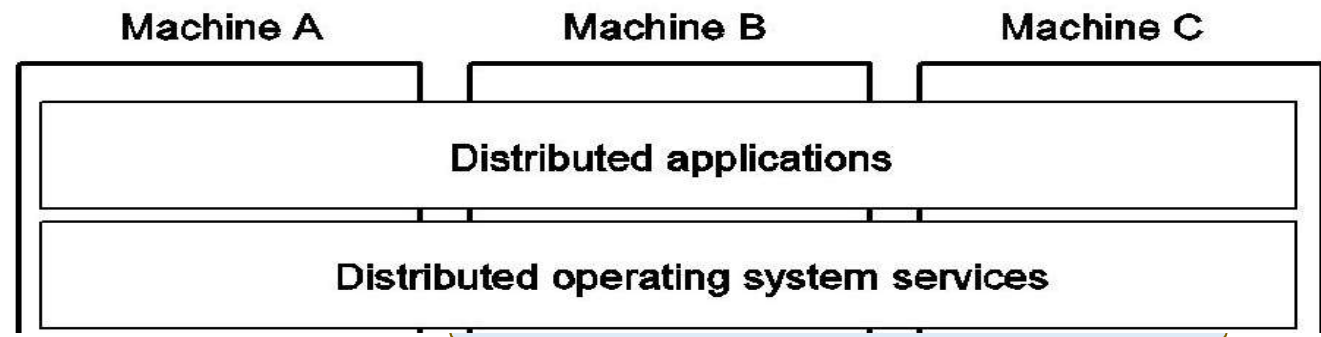
OS for personal Computers.

- A personal computer is the computer designed for the personal use of individuals or persons.

- **Microsoft** has developed different versions of famous Windows Operating system. Latest being windows10not but window 11.

- **Apple's** MacOs is Operating systems developed for personal computers called macintosh and macbooks

- Open source operating system based on Linux are Ubuntu, Fedora etc.

OS for Mobile Phones.

- Popular Operating System for Mobile Phones➜Android, IOS, Symbian, Blackberry.

- Android is the top priority for mobile phone developers. It is based on open source Linux kernel.

- IOS is developed by Apple for their iPhone

- Symbian was the OS in most of the mobile phones before Android.

- Blackberry had its own OS. blackberry has swathed to Android as well.

OS for Servers.

- Server computers are large machines in a network that provide a service like web, email and file sharing and storage.

- Windows Server 2008, 2012, 2016 etc.

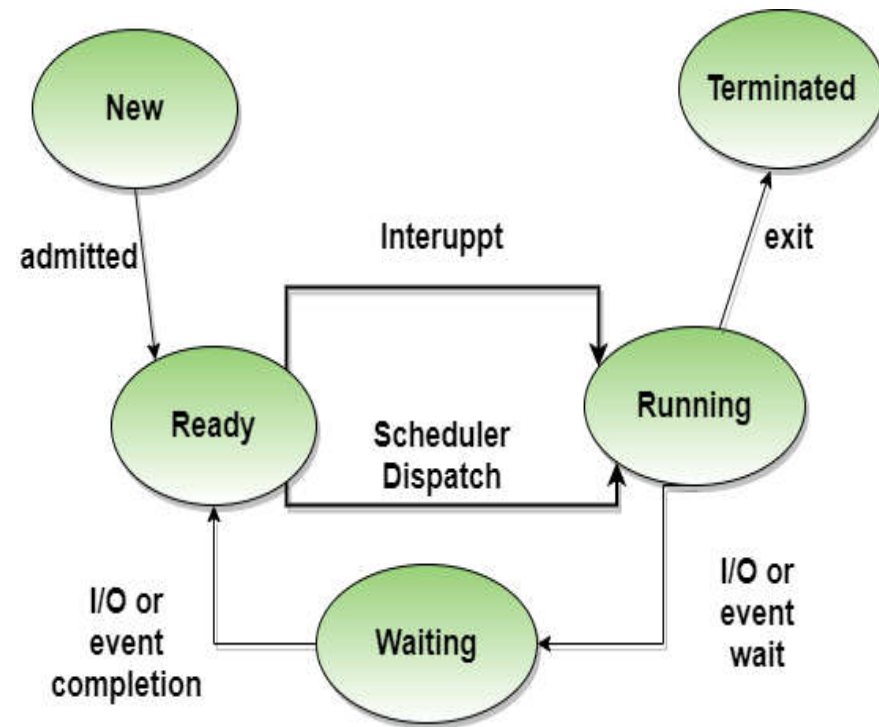- Linux based: Ubuntu, Debian, Redhat.
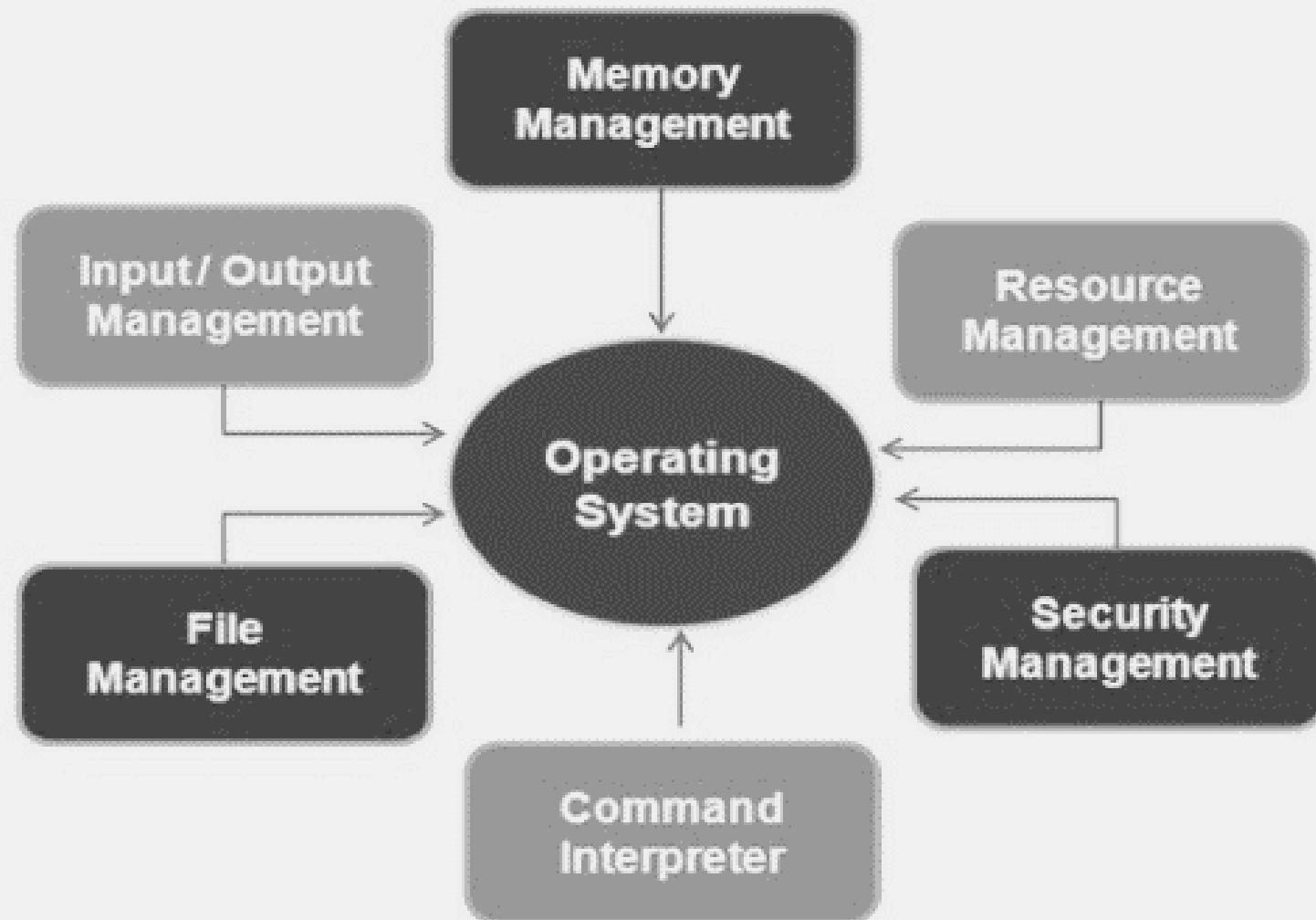
Operating system functions

- **Memory Management**: Act of keeping track of how and where a program is stored in main memory.

- Main memory is divided into blocks of words, which operating system uses to store and retrieve data.

- Multiprogramming became possible because of Memory management.
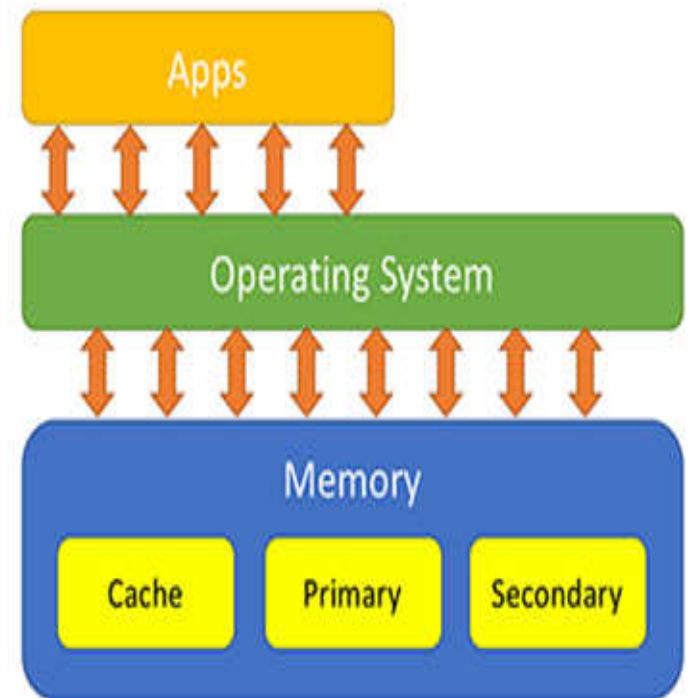
Operating system functions

- **Process Management**: Ability of an Operating system to manage which program or instruction to execute next is called Process management.

- A running program is called process.

- OS keeps track of information and states of processes.

New

Terminated

admitted

Interuppt

exit

Ready

Scheduler Dispatch

Running

I/O or event completion

Waiting

I/O or event wait

Operating system function

- **File Management**: keeping track of where and how files should be stored and organized in secondary storage or hard drive.

- Files management also provides accessing or retrieving a file, naming, sharing and protecting a file from unauthorized access.
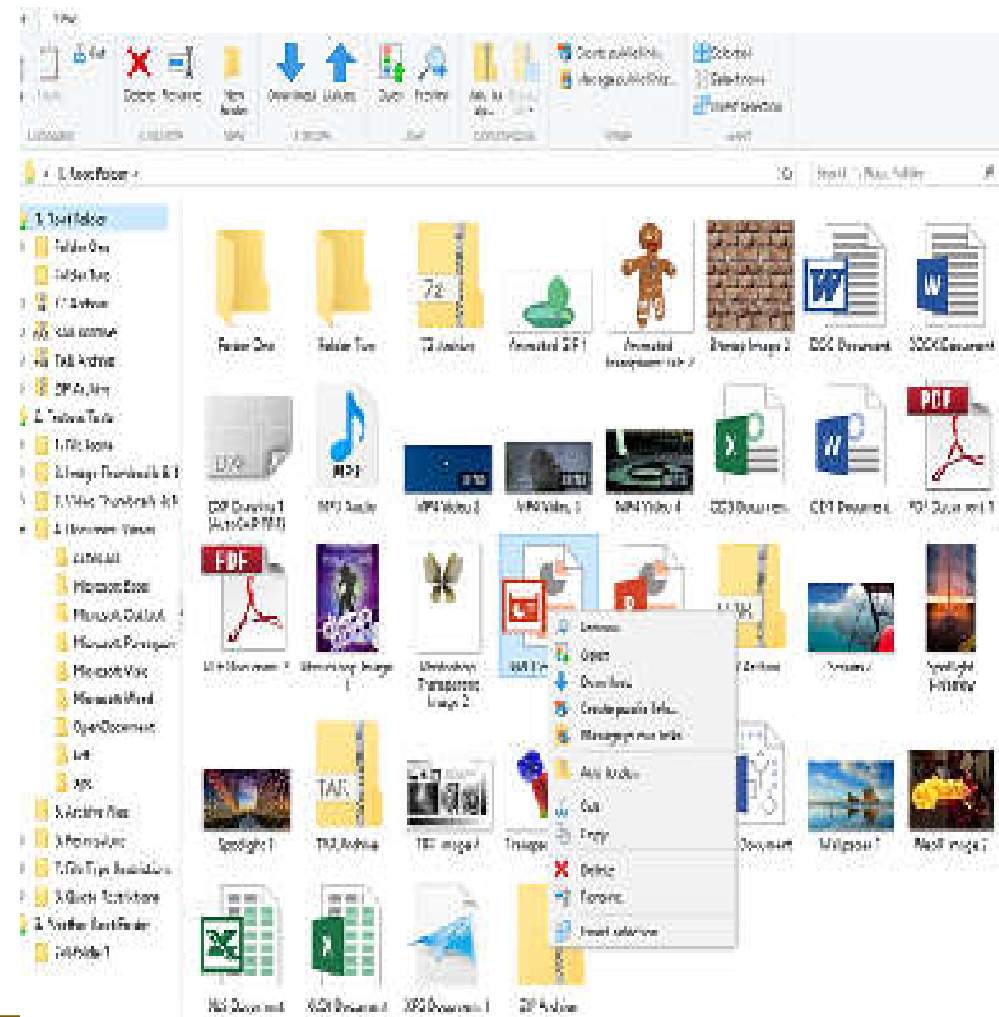
Operating system functions

- **Device Management**: OS manages devices through device drivers. Program that provides this facility is called I/O Controller.

- OS tracks status of Device like HDDs, printers, modem etc.

- OS decides which process should be given access of which device.
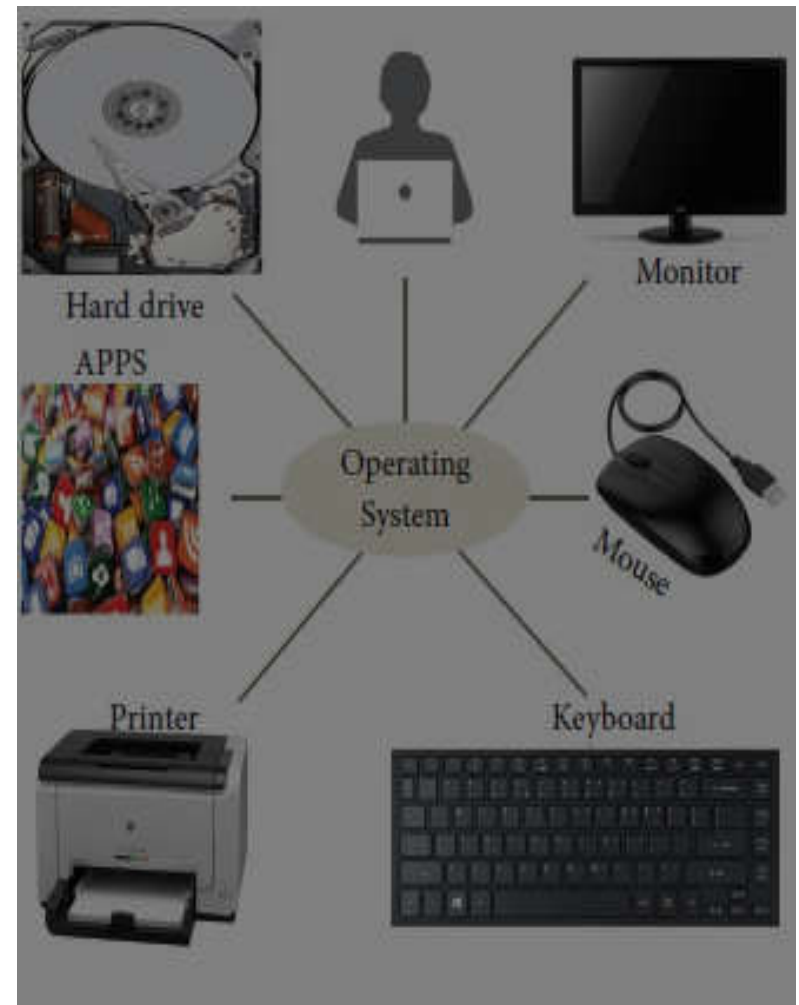
Operating system function

- **I/O Management**: operating system provide efficient management of the input and output operations using different input output devices.

- I/O Devices: Devices that perform input and output.

- Examples: Monitors, keyboard, mouse, hard disk drives, headphone, webcam, network adapters

Operating system functions

- **Security**: OS helps in implementing security in the computer systems internally as well as externally.

- Internally OS provides secures access to CPU and other resources by managing processes efficiently. Externally OS provides features to secure programs and data that are important system and the users.

Operating system function

- **Monitor System Performance**:

  Operating system monitors performance of different hardware components of the computer system.

- Operating system generates logs and alerts for reporting errors and necessary messages regarding the performance of the system.
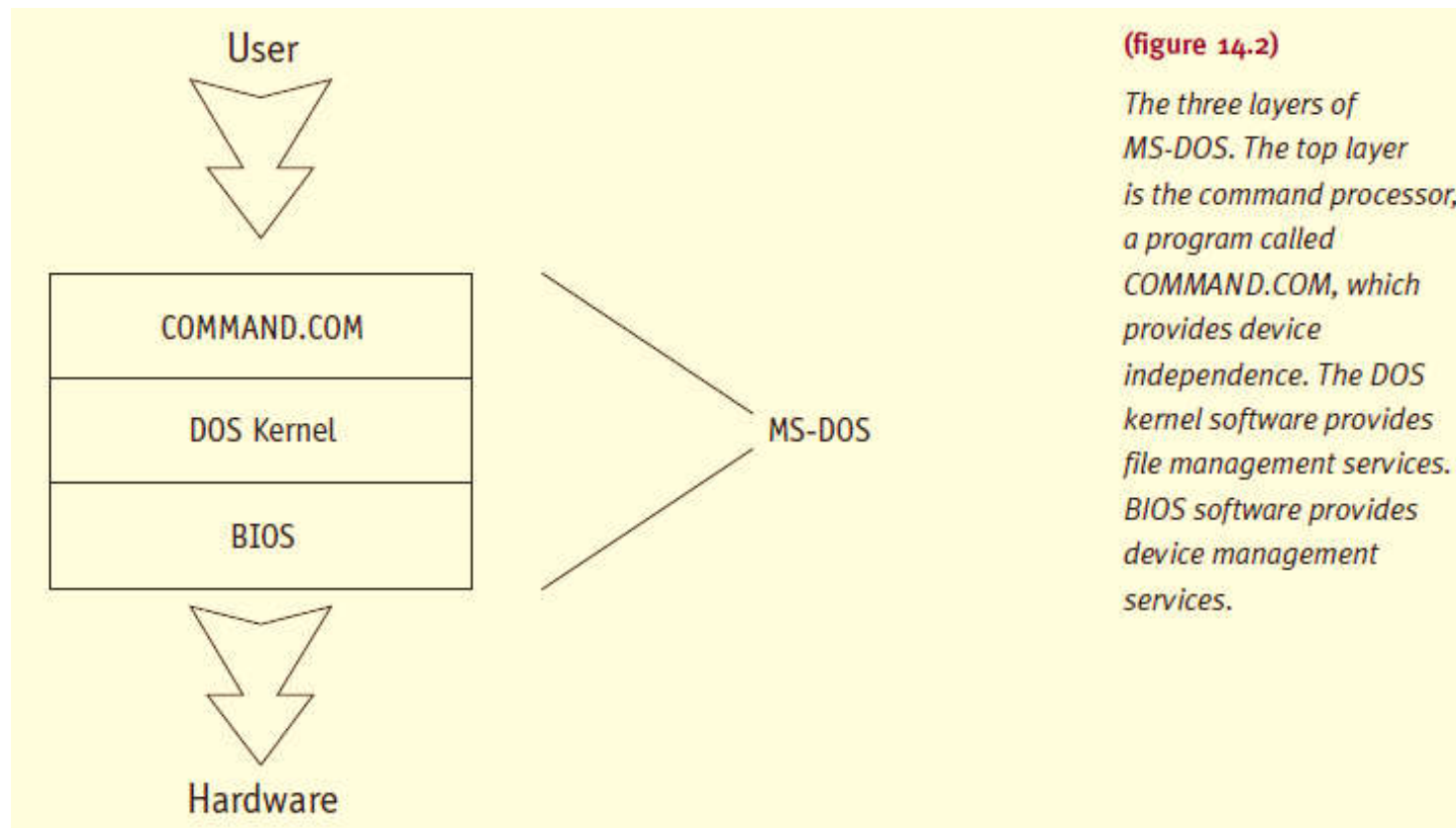
Microsoft Disk Operating System

Microsoft Disk Operating System

- Microsoft Disk Operating System, MS-DOS is a non-graphical **command line** operating system.

- It is single user single task OS.

- Programs and tasks are executed using text commands.

- It was first created in August 1981, for IBM compatible personal computers.

- Last version 6.22 of MS DOS was released in 1994.

Version No.	Release Date	Features
1.0	1981	CP/M compatible; supported only one directory
1.1	1982	Allowed double-sided 5¼ inch disks
2.0	1983	Eliminated some defects in earlier version
3.0	1984	Increased memory requirement to 36K, supported PC/AT
3.1	1984	First release to support networking
3.2	1986	Supported token ring and 3½ inch disks
3.3	1987	Supported the IBM PS/2 computer
4.0	1988	Supported hard disks larger than 32MB
5.0	1991	Better use of extended memory
6.0	1993	Better use of conventional memory
6.22	1994	Provided users with capabilities previously available only as third-party applications

Microsoft Disk Operating Systmem

(figure 14.2)

The three layers of MS-DOS. The top layer is the command processor, a program called COMMAND.COM, which provides device independence. The DOS kernel software provides file management services. BIOS software provides device management services.

Command.com

```
Current date is Tue   1-01-1980
Enter new date:
Current time is 21:35:24.18
Enter new time:


The IBM Personal Computer DOS
Version 2.00 (C)Copyright IBM Corp 1981, 1982, 1983

A>dir

 Volume in drive A has no label
 Directory of  A:\


COMMAND    COM    17664    3-08-83    12:00p
FORMAT     COM     6016    3-08-83    12:00p
CHKDSK     COM     6400    3-08-83    12:00p
SYS        COM     1408    3-08-83    12:00p
DEBUG      COM    11904    3-08-83    12:00p
SLOOP                32    1-01-80     7:44p
        6 File(s)     292864 bytes free


A>_
```

Microsoft Disk Operating System

- Windows Command line or command prompt is included in all the version of GUI based windows Operating system.

- We can navigate files and folders and run program using command prompt in windows which is the emulator of MS DOS.

- For this we will use different commands to navigates files and folders and perform different operations.

Internal Commands

- The internal commands are an integral part of the operating system.

- These are the most frequently used commands

- Built into the OS that is they are part of commad.com

- Command.com is the default command line interpreter.

- Already in memory if the OS is loaded.

- Available anytime the computer is displaying a command prompt.

- Generally, the more frequently used commands.

- Examples include: DIR, COPY, PATH, CD, MD, DEL, TIME, DATE.

Internal Commands

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- cd : Change directory or display current directory path.

- cls : Clear the window.

- dir : Display list of contents of current directory.

- help : Display list of commands or help about a command.

- copy : Copies one or more files to another location

- notepad : Run the Windows Notepad text editor.

- type : Displays the contents of a text file.

- del (or erase) : Deletes one or more files.

- date : Displays or sets the computer's date.

- time : Displays or sets the computer's time.

- md (or mkdir) : Creates a directory.

- more : Displays the contents of a file one screen at a time.

- move : Moves one or more files from one directory to another directory.

- rd (or rmdir) : Removes a directory.

- rem : Used in a batch program file to identify comments.

- ren (or rename) : Renames a file or files

External Commands

- Not a part of OS or COMMAND.COM.

- These commands are not present in same memory as OS.

- These commands are Located in another directory.

- Must be loaded into memory as needed by the OS.

- Examples include: FORMAT, DEFRAG, DISKCOPY, MEMMAKER, and SCANDISK

Syntax

- A specific set of rules that you must follow when writing commands.

- The order in which you arrange the elements of the command.

- The rules of grammar for the command line

- Command:

| Keyword | | Parameter | Switch |

Optional
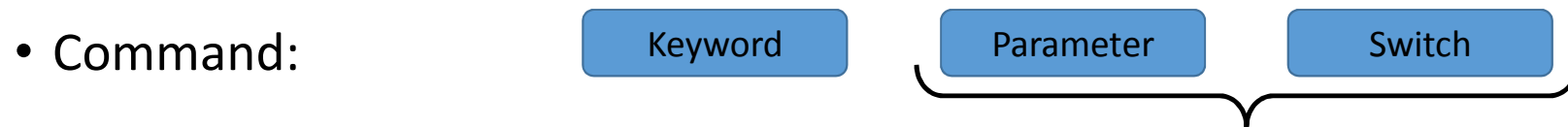
- **Keyword** - What action to perform.

- **Parameter** - What is acted upon.

- **Switches** - How to perform the action.

Syntax

- A Keyword is a unique word or set of characters that identifies the action to be performed.

- Some are quite descriptive: FORMAT, COPY, MOVE

- Others are abbreviated: DEL, DEFRAG, DBLSPACE

- **Parameters** are additional directions for the command.

- It may specify a directory or file on which to perform the action.

- It may specify a hardware device or It may specify a system setting.

Syntax

- A **switch** special type of parameter that enables or disables optional functions of the command.

- The /P switch with the DIR command displays the directory one screen at a time.

- The /W switch with the DIR command displays the directory in the wide format (five columns wide).

Command Form

Keyword	Drive/Files	Switches

Or

Keyword	Source Files	Target Files	Switches

Forward and Backward Slashed in Commands

- **** Backslashes are used as separators when specifying directory or file information.

- **/** Forward slashes are used to notify DOS that the next character is a command line switch.

Learn About A DOS command

- Type the Command and write HELP and press enter. Command line will show the purpose and use of command.

- Type the command and then follow it with the switch **/?**.

Thanks

Microsoft Windows

Windows1 1985   Windows 3.1 1992   Windows 95 1995   Windows XP 2001   Windows Vista 2006   Windows 7 2009   Windows 8 2012   Windows 10 2015

Window 11
2021

Microsoft Windows

- Microsoft Windows is a group of several proprietary graphical operating system families, all of which are developed and marketed by Microsoft. Each family caters to a certain sector of the computing industry.

Developer	Microsoft
Initial Release	20th November 1985
Marketing Target	Personal Computing
Languages	Available in 138 languages
Default User Interface	Windows Shell
Official Website	https://www.microsoft.com/

Microsoft Windows History

- It was 1983 when work on "Interface Manager" was started by Microsoft but it was in November 1985, when the first Windows 1.0 was introduced.

- Later on, with developments in technology, the requirement of the people and increased demand for Graphical User Interface, Microsoft kept releasing revised versions of Operating Systems.
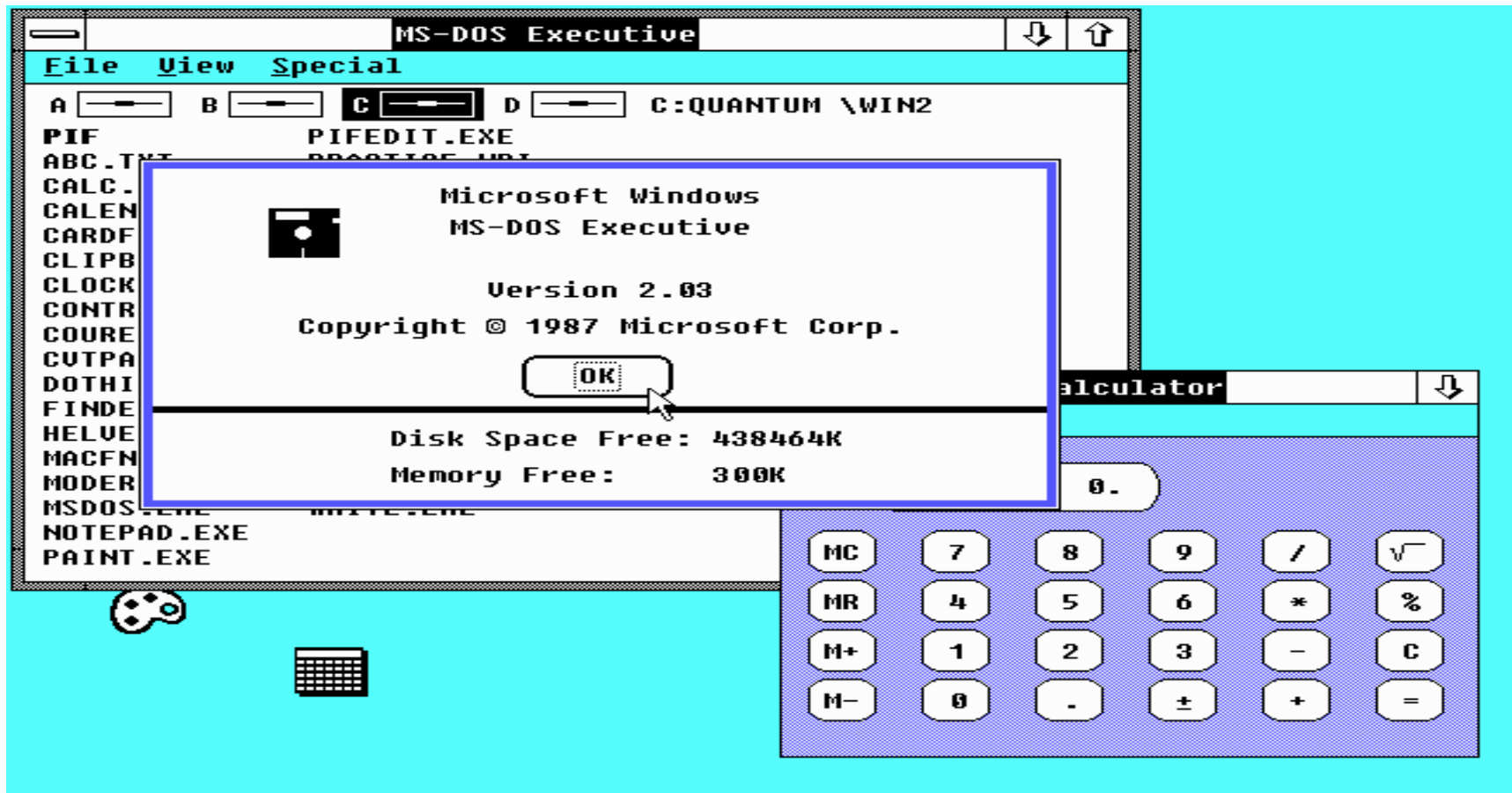
Windows 1.0
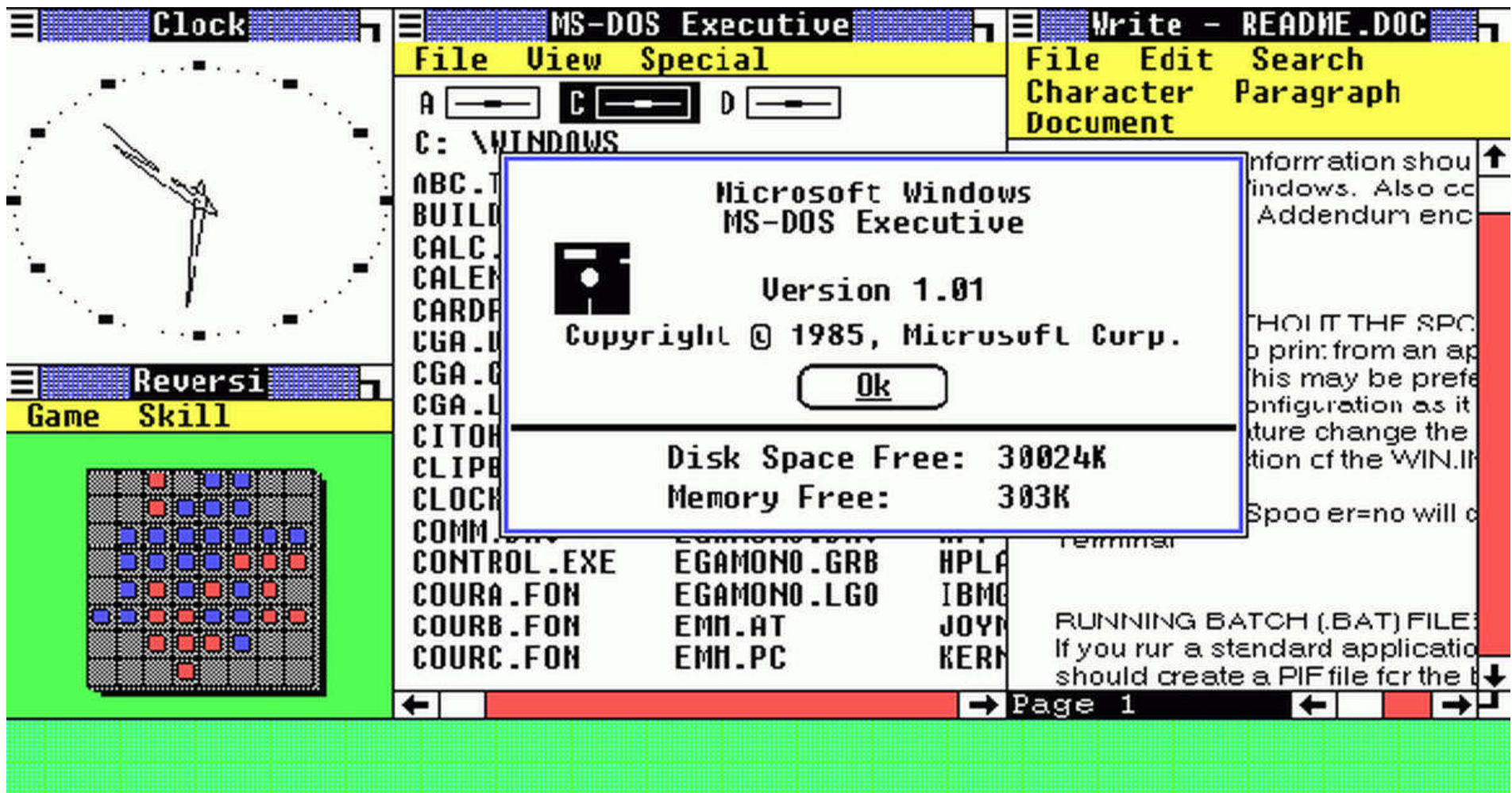
Windows 1.0

- It was released on November 20, 1985

- Pure Operating Environment

- Used Graphical User Interface

- Simple Graphics

- Offered limited multi-tasking was expected to have a better future potential
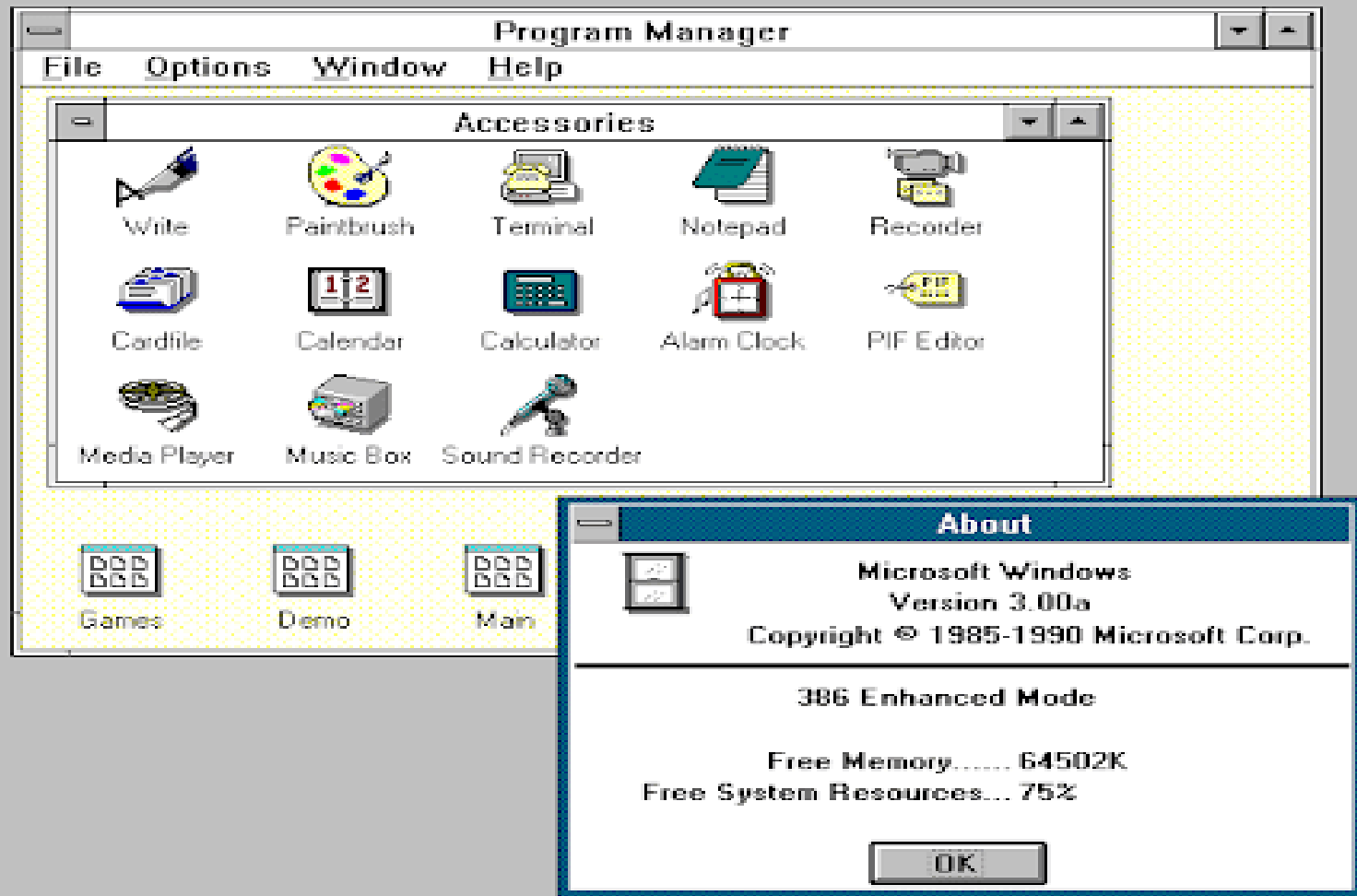
Windows 2.0

Windows 2.0

- It was released on December 9, 1987

- 16-bit Graphic User Interface (GUI) based operating environment

- Introduced Control Panel, and the first version of MS Word and Excel

- Unlike Windows 1.0, it had the capacity to allow applications to overlap each other

- It was also the last Windows OS which did not require a hard disk

- Hardware played an important role

Windows 3.0

Windows 3.0

- It was released in 1990

- It was better at multitasking

- Used 8086 microprocessors

- It has both, conventional and extendable memory

- First version of Windows to gather critical appreciation

- Better memory/ storage

Window 95

Window 95

- It was the first complete Operating System

- It was released on August 15, 1995

- It merged MS-DOS and Windows products

- It simplified plug and play features

- Taskbar and Start menu was introduced with this Windows OS

- Advanced from 16 bit GUI to 32 bit GUI

- Long file names could be saved

- Initially, computers with Windows 95 did not have Internet Explorer installed but by the release date of Windows 95, the first version of Internet Explorer was installed in the software

- On December 31, 2001, Windows declared this version of OS outdated and ended its support for the same
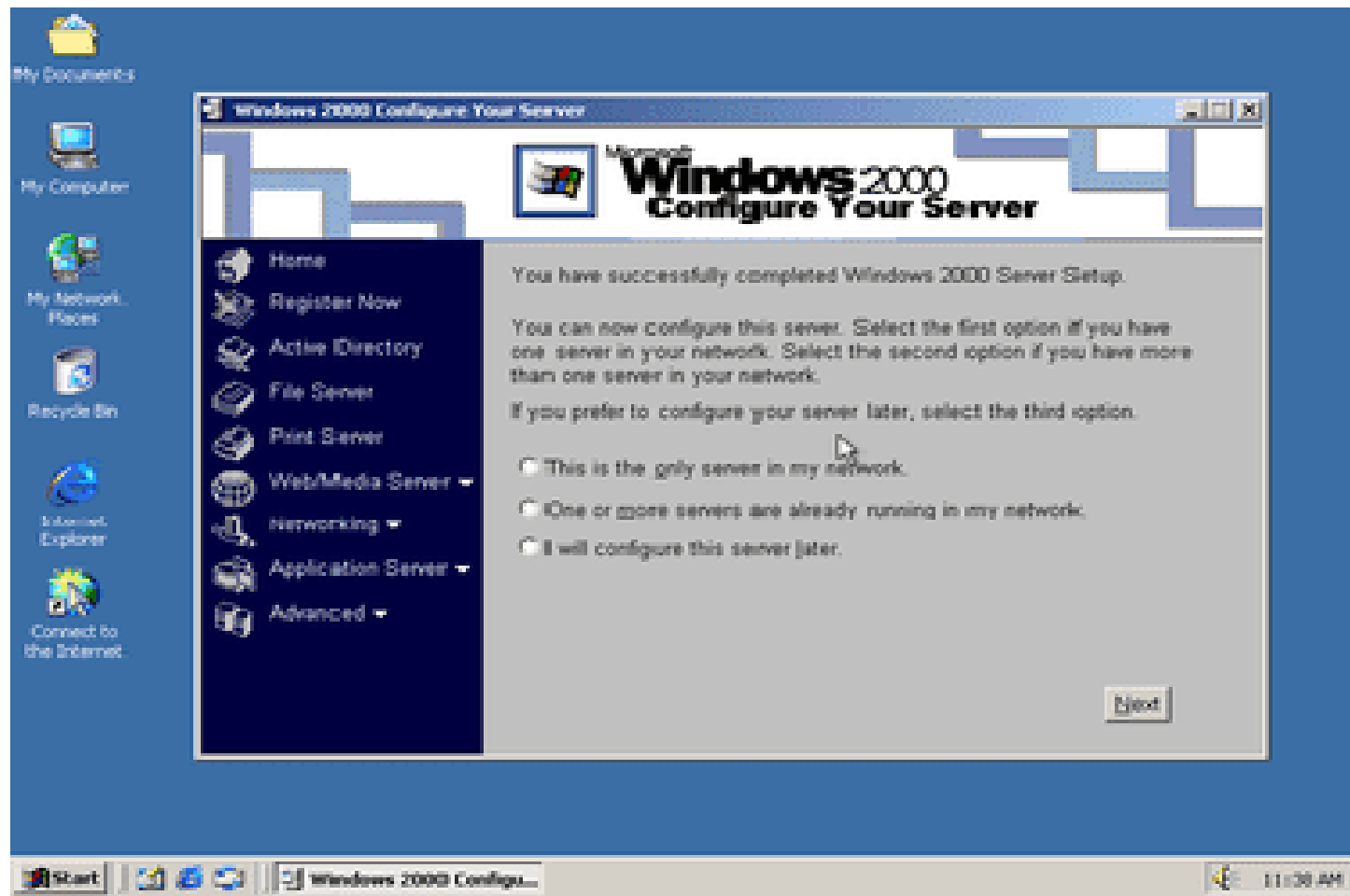
Windows 98
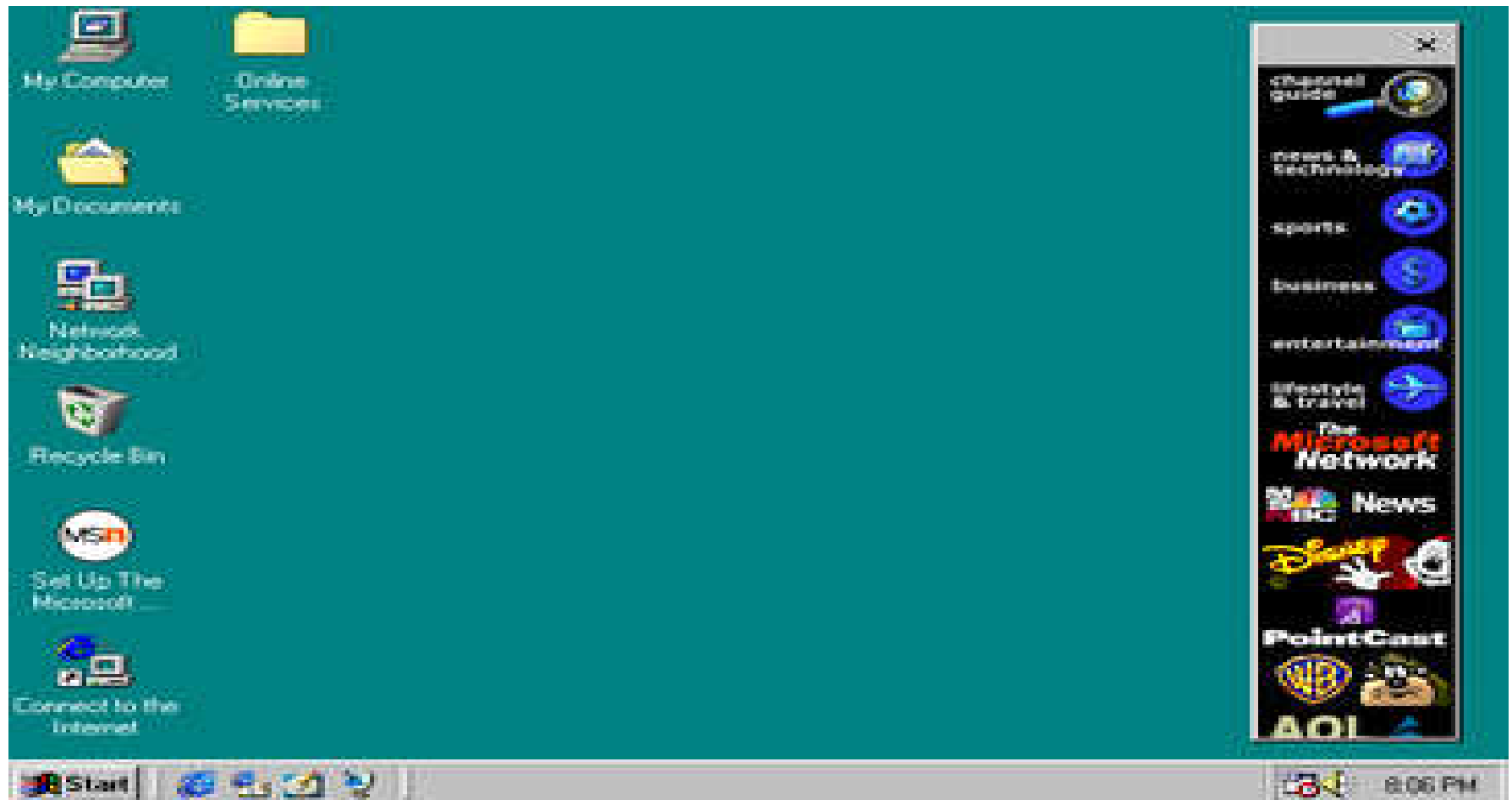
Windows 98

- It was released to manufacturing on May 15, 1998

- It was a 16 bit and 32 bit product based on MS DOS

- It was not an entirely new version but just a tuned-up version to Windows 95

- Internet Explorer 4.01 was released along with this Windows version

- It did not support USB printers or mass storage devices

- An update to this version "Windows SE" was released in 1999

Windows 2000

Windows 2000

- It was officially released on February 17, 2000. However, its manufacturing had begun in late 1999

- A core set of features was followed for manufacturing Windows 2000 but 4 different editions, targeting different sectors of the market were released. These included: Server, Professional, Advanced Server and Datacenter Server

- It was considered as one of the most secure OS ever

- A local disk manager was introduced with these Windows

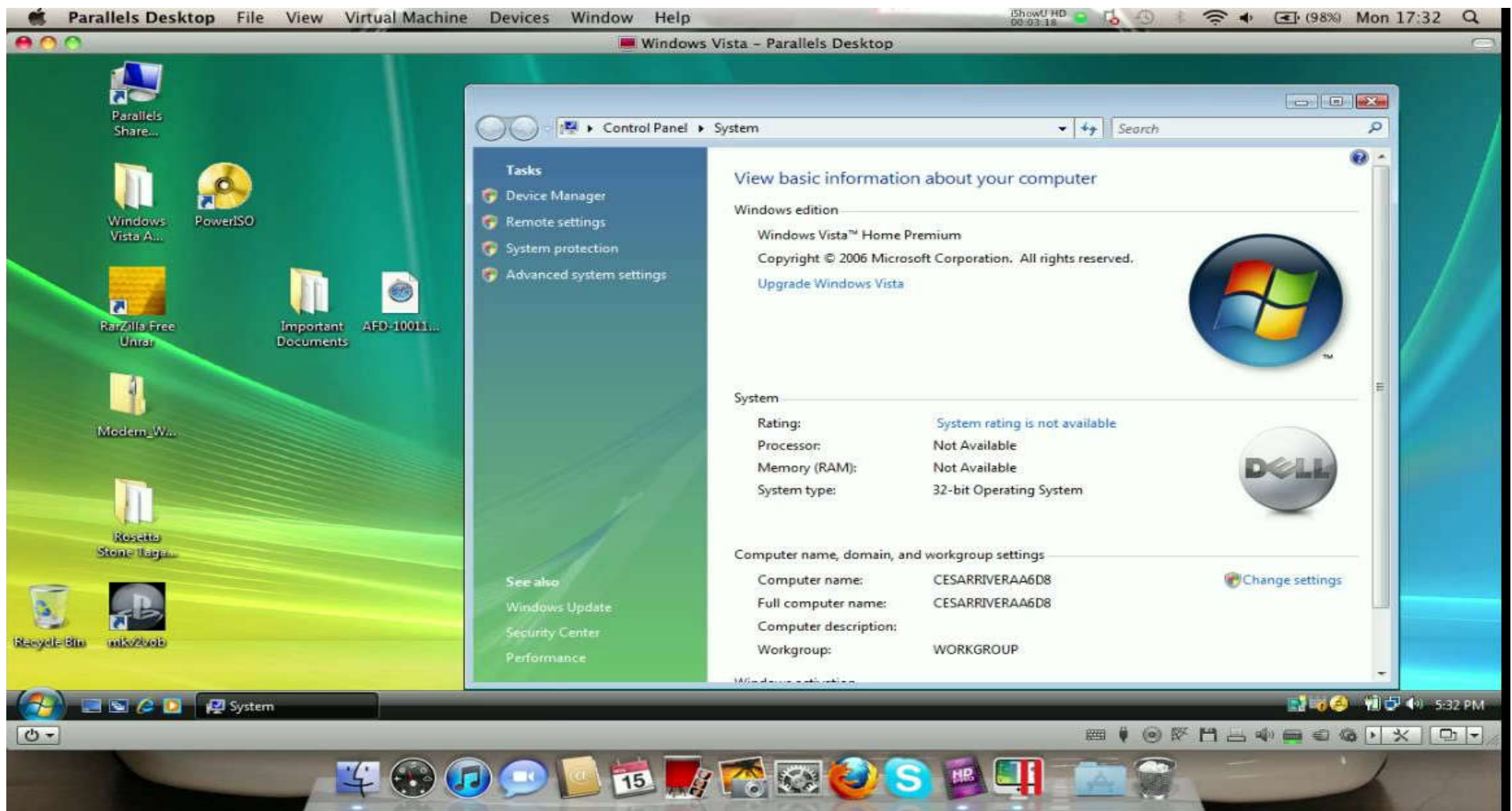- Multilingual User Interface – it supported many different languages

Windows XP
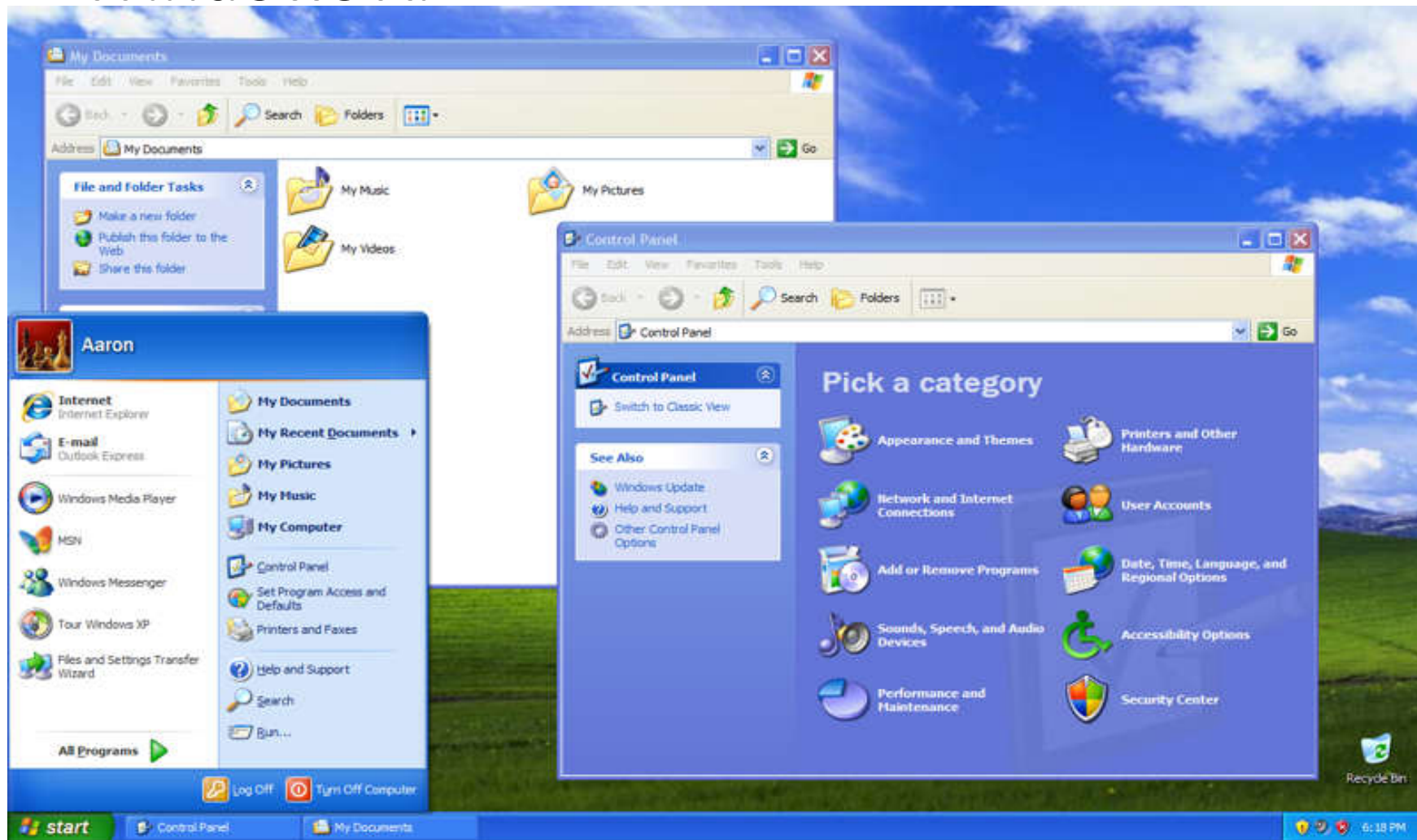
Windows XP

- While the manufacturing started on August 24, 2001, the official product was released on October 25, 2001

- Advanced portable PC support

- Automatic wireless connection support

- Fast start-up

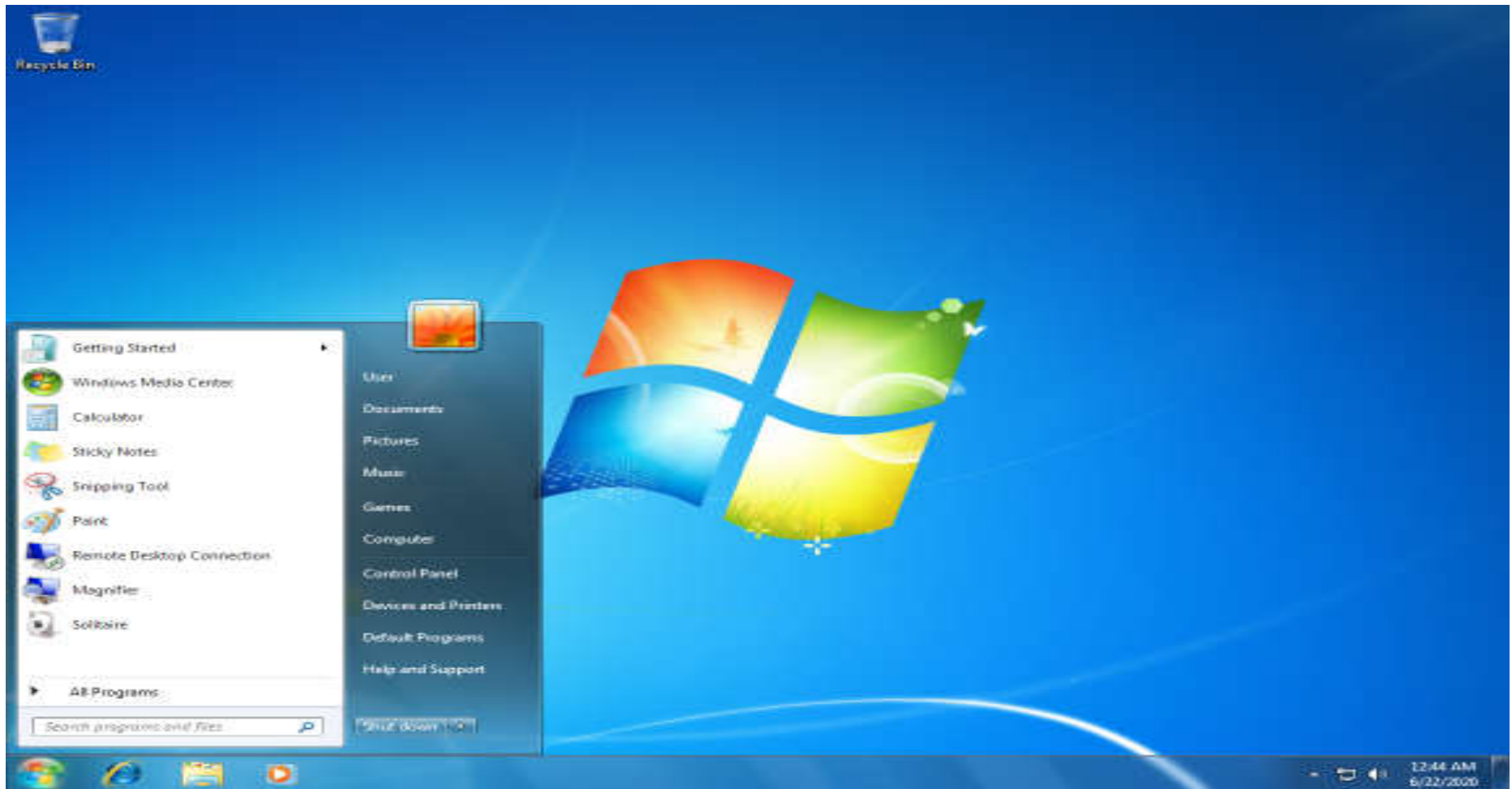- Better Graphical User Interface (GUI)

- Help and support centre

Windows Vista

Windows Vista

- It was released on January 30, 2007

- It had an upgraded version of Graphical User Interface

- It was the first operating system to use DVD-ROM for installation.
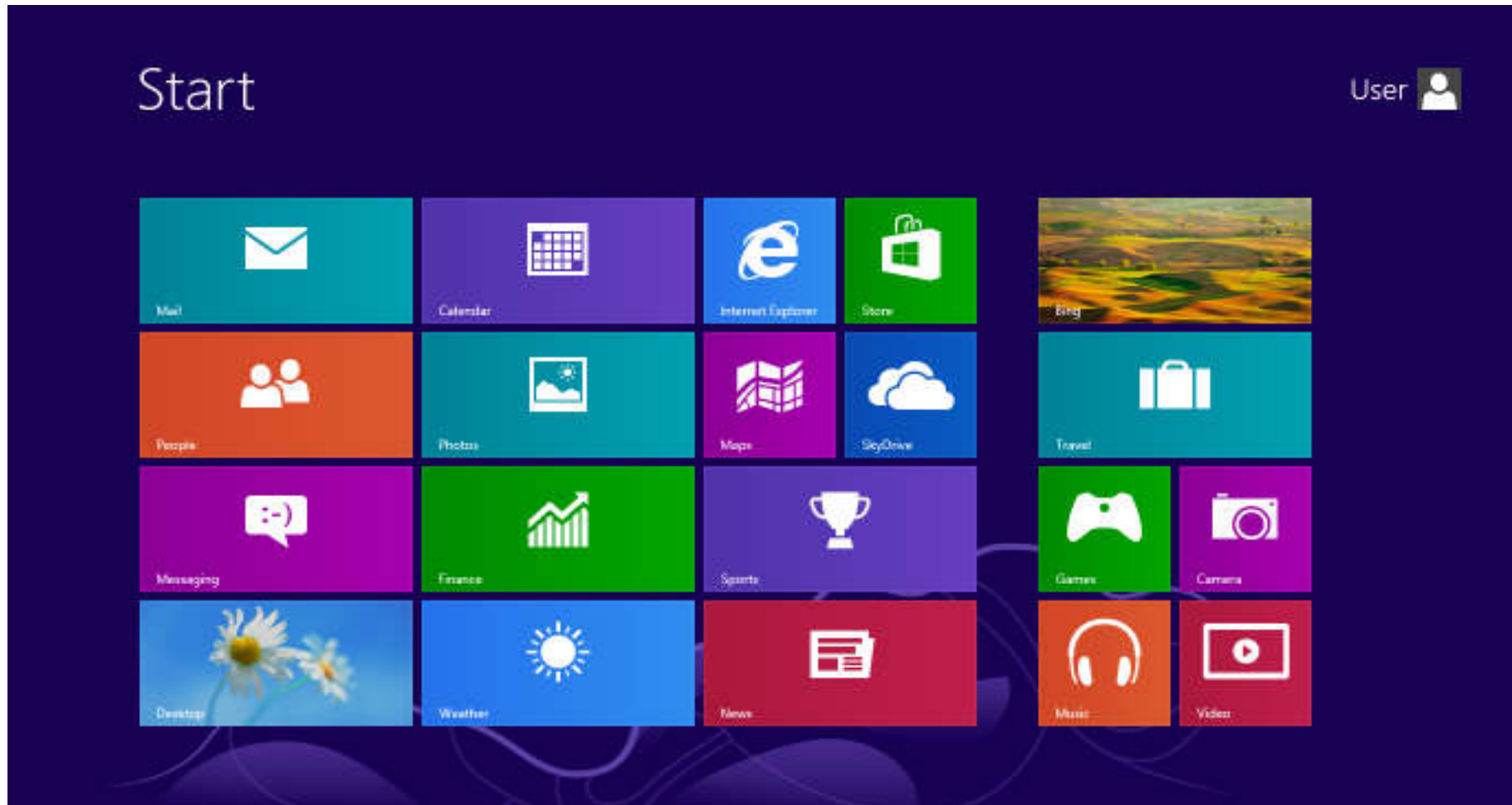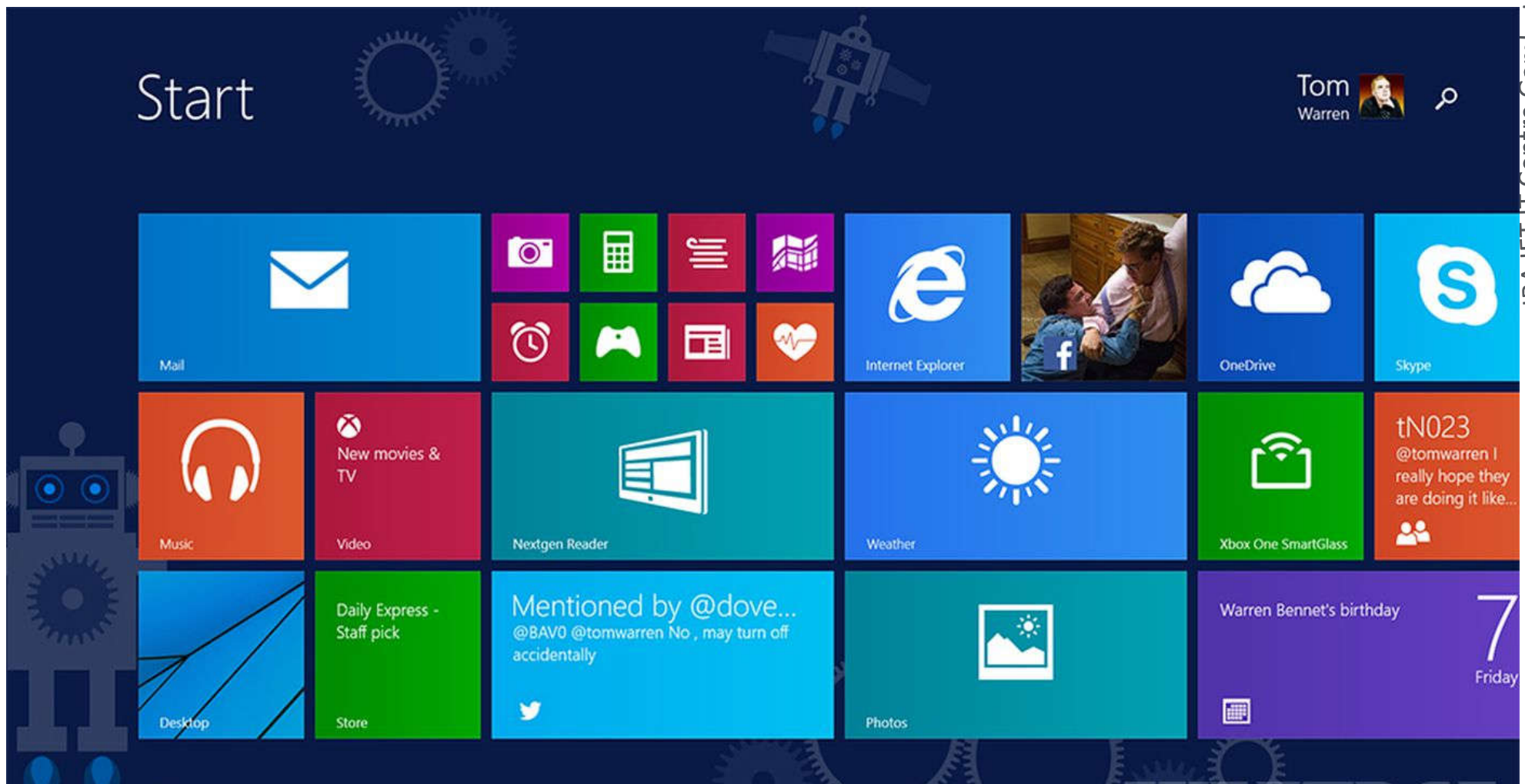
Windows 7

Windows 7

- It was released on October 22, 2009

- A large number of new features were introduced

- Redesigned Windows shell with an updated taskbar

- Incremental upgrade to the Windows line

- Libraries were added in the file management system

- A few features from the past Windows were removed

- Extended hardware support

Windows 8

Windows 8.1

Windows 8

- It was released for retail on October 26, 2012

- Optimisations for touch-based

- Installed in new devices like Laptops, Mobile phones, tablets, etc.

- Increased integration with cloud services

- Windows Store service for software distribution

- Task manager had been redesigned

- New security features were introduced

- Online Applications could be directly downloaded.

Windows 10

Windows 10

- It was released on July 29, 2015

- Addresses shortcomings in the user interface first introduced with Windows 8

- A virtual desktop system

- It had the ability to run windows store apps within windows on the desktop rather than in the full-screen mode

- Included new icons

- To reduce storage shortcomings, Windows 10 automatically compresses the file size.

Important Commands for Windows

cd – change directory	help – help about a command
cls – clear window	notepad – windows notepad text editor
dir – display list of contents of current directory	type – displays content of text file
assoc – display/modify file extensions	attrib – displays/ change file attributes
call – calls one batch program file from another	color – set text and background colour
comp – compares the contents of two files	copy – to copy one or more files to another location
date – displays date	del – delete multiple files
edit – Run MS-DOS text editor	exit – close MS-DOS window
find – search for a text string in a file	move – move one or more files to another location

THANKS

Windows

Windows 95

- Windows 95 is an operating system released by Microsoft in August 1995. Came after Windows 3.11

- One of the most successful Winodws OS ever

- Windows Start button and desktop were first introduced in Windows 95.

- **System Requirements**

- 80386 DX or higher

- 4 MB RAM

- 35 MB hard drive space

- CD-ROM or floppy

- Sound Blaster compatible sound card.

- VGA or higher-resolution

- 100% compatible Microsoft keyboard and mouse

- DOS 5.0 and higher needed for an upgrade

Windows 95 Features

- **Plug and Play** - Plug and play allowed hardware devices to be automatically installed into the computer with the proper software. Does not require jumpers to be used.

- **Device Manager** - Introduced Device Manager to help list and control computer hardware.

- **32-Bit** - A 32-bit operating system allowing the computer to run faster and more efficiently, and support 32-bit applications.

- **Registry** - Combines the power of multiple configuration files into two registry files, allowing the system configurations to be located easier.

- **Memory** - Windows 95 has an improved memory handling processes compared to Windows 3.11.

- **Right mouse click** - Allows access and text manipulation by utilizing the right mouse button (right-click) instead of only one button.

- **CD Player** - Enhanced CD Player with improved usability and AutoPlay feature

Windows 98

- Windows 98 was released in 98 and was an upgrade to Windows 95.

  - **System Requirements**

  - 486DX/66 MHz or Higher processor

  - 16 MB of RAM

  - Approximately 195 MB; can take up to 295 MB of hard drive space

  - CD-ROM or floppy

  - Standard sound card for sound capability.

  - VGA or higher-resolution

  - 100% compatible Microsoft keyboard and mouse

  - Windows 3.x, 3.1x or Windows 95 to upgrade

  - Includes DirectX 5.0

Windows 98 Features

- **Protection** - Windows 98 includes additional protection for important files on your computer such as backing up your registry automatically.

- **Improved support** - Improved support for new devices and technologies such as ACPI, AGP, IEEE 1394, DVD, USB, and MMX.

- **FAT32** - Windows 98 has the capability of converting your drive to FAT32 without losing any information.

- **PnP** - Improved PnP support, to detect devices even better than Windows 95.

- **Internet Explorer 4.0** - Includes Internet Explorer 4.0

- **Customizable Taskbar** - Windows adds new features to the Taskbar such as Quick Launch that Windows 95 and Windows NT did not have.

- **Active Desktop** - Includes Active Desktop that allows for users to customize their desktop with the look of the Internet.

- **New background properties** - You can now set *.bmp, *.pcx, *.jpg, *.gif, and *.htm files as your wallpaper (background).

- **Updated Microsoft Paint** - The updated paint allows you to open *.bmp, *.pcx, *.jpg, and *.gif files.

- **Multiple monitor support** - Windows 98 now supports multiple monitors on one computer.

- **Personal Web Server** - PWS supports CGI (common gateway interface) and ISAPI (Internet Server Application Programming Interface) applications.

- **Improved floppy drive** - Includes HSFLOP.PDR floppy disk driver that helps speed up access for many floppy disk drives.

Microsoft Windows XP

- Short for Windows eXPerience, Windows XP is an operating system that was first released on October 25, 2001, by Microsoft.

- The Windows XP upgrade was available for Windows 98, ME, and Windows 2000 users.

- The two primary versions of Windows XP are Windows XP Home Edition and Windows XP Professional.

- **XP Features**

- New interface - A completely new look and ability to change the look.

- Updates - A new feature that automatically obtains updates from the Internet.

- Internet Explorer 6 - Includes Internet Explorer 6 and new IM.

- Multilingual support - Added support for different languages.

- Increase reliability compared to previous versions of Microsoft Windows**.**

XP System Requirements

- 233 MHz or faster processor.

- 64 MB RAM minimum (128 MB recommended).

- 1.5 GB hard drive space.

- CD-ROM or DVD drive.

- SVGA video card.

- 100% compatible Microsoft keyboard and mouse.

- Standard sound card for sound capability.

- Upgrade requires Windows 98, 98 SE, or ME.